

**AMENDMENTS TO THE CLAIMS****1-14. (Canceled)**

**15. (New)** An optical transmitting device for transmitting an optical signal via an optical transmission path to a receiving device connected via prescribed communication lines to first to n'th terminal devices (where n is an integer of 2 or more), the optical transmitting device comprising:

a modulating section for generating first to n'th modulated signals based on first to n'th data signals to be transmitted to the first to n'th terminal devices, respectively, the first to n'th modulated signals being obtained by modulation with individual modulation parameters;

an optical transmitting section for converting the first to n'th modulated signals generated by the modulating section into an optical signal and for transmitting the optical signal to the receiving device via the optical transmission path;

a data amount estimating section for estimating an amount of data for each of the first to n'th data signals; and

a parameter control section for setting the individual modulation parameters used in the modulating section based on amounts of data for the first to n'th data signals estimated by the data amount estimating section,

wherein the data amount estimating section previously holds information about each of the first to n'th terminal devices with respect to use of a corresponding one of the prescribed communication lines, and estimates the amount of data for each of the first to n'th data signals based on the information and a current time.

16. (New) An optical transmitting device for transmitting an optical signal via an optical transmission path to a receiving device connected via prescribed communication lines to first to n'th terminal devices (where n is an integer of 2 or more), the optical transmitting device comprising:

a modulating section for generating first to n'th modulated signals based on first to n'th data signals to be transmitted to the first to n'th terminal devices, respectively, the first to n'th modulated signals being obtained by modulation with individual modulation parameters;

an optical transmitting section for converting the first to n'th modulated signals generated by the modulating section into an optical signal and for transmitting the optical signal to the receiving device via the optical transmission path;

a data amount estimating section for estimating an amount of data for each of the first to n'th data signals; and

a parameter control section for setting the individual modulation parameters used in the modulating section based on amounts of data for the first to n'th data signals estimated by the data amount estimating section,

wherein the parameter control section comprises:

a group classifying section for classifying the first to n'th data signals into a plurality of groups in accordance with the amount of data estimated for each of the first to n'th data signals by the data amount estimating section; and

a parameter setting section for setting modulation parameters at the same value for each of data signals classified into the same group by the group classifying section.

17. (New) The optical transmitting device according to claim 16, wherein:

the parameter control section further includes a histogram generating section for generating, based on amounts of data estimated by the data amount estimating section, a histogram in which the amounts of data are divided into prescribed units of divisions; and

the group classifying section is operable to use the histogram generated by the histogram generating section to form the plurality of groups.

18. (New) An optical transmitting device for transmitting an optical signal via an optical transmission path to a receiving device connected via prescribed communication lines to first to n'th terminal devices (where n is an integer of 2 or more), the optical transmitting device comprising:

a modulating section for generating first to n'th modulated signals based on first to n'th data signals to be transmitted to the first to n'th terminal devices, respectively, the first to n'th modulated signals being obtained by modulation with individual modulation parameters;

an optical transmitting section for converting the first to n'th modulated signals generated by the modulating section into an optical signal and for transmitting the optical signal to the receiving device via the optical transmission path;

a data amount estimating section for estimating an amount of data for each of the first to n'th data signals; and

a parameter control section for setting the individual modulation parameters used in the modulating section based on amounts of data for the first to n'th data signals estimated by the

data amount estimating section,

wherein the parameter control section is operable to set the individual modulation parameters so as to have values within a range such that the first to n'th modulated signals satisfy a condition concerning a transmission quality in the optical transmission path, and

wherein the parameter control section further includes:

a condition determination section for determining, based on the individual modulation parameters, whether the first to n'th modulated signals satisfy the condition concerning the transmission quality in the optical transmission path; and

a modifying section for modifying the individual modulation parameters when the condition determination section determines that the condition is not satisfied.

19. (New) The optical transmitting device according to claim 18, wherein the condition is such that a total mean square root optical modulation index, which is determined based on the individual modulation parameters of the first to n'th modulated signals, is lower than or equal to a prescribed value.

20. (New) An optical transmitting device for transmitting an optical signal via an optical transmission path to a receiving device connected via prescribed communication lines to first to n'th terminal devices (where n is an integer of 2 or more), the optical transmitting device comprising:

a modulating section for generating first to n'th modulated signals based on first to n'th

data signals to be transmitted to the first to n'th terminal devices, respectively, the first to n'th modulated signals being obtained by modulation with individual modulation parameters;

an optical transmitting section for converting the first to n'th modulated signals generated by the modulating section into an optical signal and for transmitting the optical signal to the receiving device via the optical transmission path;

a data amount estimating section for estimating an amount of data for each of the first to n'th data signals; and

a parameter control section for setting the individual modulation parameters used in the modulating section based on amounts of data for the first to n'th data signals estimated by the data amount estimating section,

wherein the individual modulation parameters include the number of subcarriers used for performing discrete multi-tone modulation on each of the first to n'th data signals.

21. (New) An optical transmission system comprising:

a transmitting device for transmitting a signal via an optical transmission path;

a receiving device for receiving the signal transmitted via the optical transmission path;

and

first to n'th (where n is an integer of 2 or more) terminal devices connected via respective prescribed communication lines to the receiving device,

wherein the transmitting device comprises:

a modulating section for generating first to n'th modulated signals based on first to

n'th data signals to be transmitted to the first to n'th terminal devices, respectively, the first to n'th modulated signals being obtained by modulation with individual modulation parameters;

an optical transmitting section for converting the first to n'th modulated signals generated by the modulating section into an optical signal and for transmitting the optical signal to the receiving device via the optical transmission path;

a data amount estimating section for estimating an amount of data for each of the first to n'th data signals; and

a parameter control section for setting the individual modulation parameters used in the modulating section based on amounts of data for the first to n'th data signals estimated by the data amount estimating section,

wherein the receiving device includes:

an optical receiving section for receiving the optical signal transmitted via the optical transmission path and for converting the optical signal into an electric signal; and

an electric transmitting section for transmitting the first to n'th modulated signals contained in the electric signal, which is obtained by conversion via the optical receiving section, to the first to n'th terminals to which the first to n'th modulated signals should be transmitted via the prescribed communication lines,

wherein each of first to n'th terminal devices includes a demodulating section for demodulating a modulated signal transmitted via a corresponding one of the prescribed communication lines, and

wherein the data amount estimating section previously holds information about each of

the first to n'th terminal devices with respect to use of a corresponding one of the prescribed communication lines, and is operable to estimate the amount of data for each of the first to n'th data signals based on the information and a current time.

22. (New) The optical transmission system according to claim 21, further comprising a first transmission path connected between the receiving device and the transmitting device, wherein the receiving device further includes:

a distortion monitoring section for detecting a distortion level at a prescribed frequency in an electric signal obtained by optical-to-electrical conversion via the optical receiving section; and

a distortion information transmitting section for transmitting distortion level information about a distortion level detected by the distortion monitoring section to the transmitting device via the first transmission path, and

wherein the parameter control section is operable to set the individual modulation parameters such that the distortion level indicated by the distortion level information transmitted via the first transmission path becomes lower than or equal to a prescribed distortion level value.

23. (New) The optical transmission system according to claim 21, further comprising second transmission paths connected between each of the first to n'th terminal devices and the transmitting device,

wherein each of the first to n'th terminal devices further includes:

a quality detecting section for detecting signal quality of the modulated signals transmitted via the prescribed communication lines; and

a quality information transmitting device for transmitting the signal quality information about the signal quality detected by the quality detecting section via the prescribed communication lines, and

wherein the parameter control section is operable to set the individual modulation parameters such that the signal quality indicated by the signal quality information transmitted via the second transmission path satisfies a prescribed requirement.

**24. (New)** An optical transmission system comprising:

a transmitting device for transmitting a signal via an optical transmission path;

a receiving device for receiving the signal transmitted via the optical transmission path;

and

first to n<sup>th</sup> (where n is an integer of 2 or more) terminal devices connected via respective prescribed communication lines to the receiving device,

wherein the transmitting device comprises:

a modulating section for generating first to n<sup>th</sup> modulated signals based on first to n<sup>th</sup> data signals to be transmitted to the first to n<sup>th</sup> terminal devices, respectively, the first to n<sup>th</sup> modulated signals being obtained by modulation with individual modulation parameters;

an optical transmitting section for converting the first to n<sup>th</sup> modulated signals generated by the modulating section into an optical signal and for transmitting the optical signal



to the receiving device via the optical transmission path;

a data amount estimating section for estimating an amount of data for each of the first to n'th data signals; and

a parameter control section for setting the individual modulation parameters used in the modulating section based on amounts of data for the first to n'th data signals estimated by the data amount estimating section,

wherein the receiving device includes:

an optical receiving section for receiving the optical signal transmitted via the optical transmission path and for converting the optical signal into an electric signal; and

an electric transmitting section for transmitting the first to n'th modulated signals contained in the electric signal, which is obtained by conversion via the optical receiving section, to the first to n'th terminals to which the first to n'th modulated signals should be transmitted via the prescribed communication lines,

wherein each of first to n'th terminal devices includes a demodulating section for demodulating a modulated signal transmitted via a corresponding one of the prescribed communication lines, and

wherein the parameter control section comprises:

a group classifying section for classifying the first to n'th data signals into a plurality of groups in accordance with the amount of data estimated for each of the first to n'th data signals by the data amount estimating section; and

a parameter setting section for setting modulation parameters at the same value for

each of data signals classified into the same group by the group classifying section.

**25. (New)** The optical transmitting system according to claim 24, wherein:

the parameter control section further includes a histogram generating section for generating, based on amounts of data estimated by the data amount estimating section, a histogram in which the amounts of data are divided into prescribed units of divisions; and the group classifying section is operable to use the histogram generated by the histogram generating section to form the plurality of groups.

**26. (New)** The optical transmission system according to claim 24, further comprising a first transmission path connected between the receiving device and the transmitting device, wherein the receiving device further includes:

a distortion monitoring section for detecting a distortion level at a prescribed frequency in an electric signal obtained by optical-to-electrical conversion via the optical receiving section; and

a distortion information transmitting section for transmitting distortion level information about a distortion level detected by the distortion monitoring section to the transmitting device via the first transmission path, and

wherein the parameter control section is operable to set the individual modulation parameters such that the distortion level indicated by the distortion level information transmitted via the first transmission path becomes lower than or equal to a prescribed distortion level value.

27. (New) The optical transmission system according to claim 24, further comprising second transmission paths connected between each of the first to n'th terminal devices and the transmitting device,

wherein each of the first to n'th terminal devices further includes:

a quality detecting section for detecting signal quality of the modulated signals transmitted via the prescribed communication lines; and

a quality information transmitting device for transmitting the signal quality information about the signal quality detected by the quality detecting section via the prescribed communication lines, and

wherein the parameter control section is operable to set the individual modulation parameters such that the signal quality indicated by the signal quality information transmitted via the second transmission path satisfies a prescribed requirement.

28. (New) An optical transmission system comprising:

a transmitting device for transmitting a signal via an optical transmission path;

a receiving device for receiving the signal transmitted via the optical transmission path;

and

first to n'th (where n is an integer of 2 or more) terminal devices connected via respective prescribed communication lines to the receiving device,

wherein the transmitting device comprises:

a modulating section for generating first to n'th modulated signals based on first to

n'th data signals to be transmitted to the first to n'th terminal devices, respectively, the first to n'th modulated signals being obtained by modulation with individual modulation parameters;

an optical transmitting section for converting the first to n'th modulated signals generated by the modulating section into an optical signal and for transmitting the optical signal to the receiving device via the optical transmission path;

a data amount estimating section for estimating an amount of data for each of the first to n'th data signals; and

a parameter control section for setting the individual modulation parameters used in the modulating section based on amounts of data for the first to n'th data signals estimated by the data amount estimating section,

wherein the receiving device includes:

an optical receiving section for receiving the optical signal transmitted via the optical transmission path and for converting the optical signal into an electric signal; and

an electric transmitting section for transmitting the first to n'th modulated signals contained in the electric signal, which is obtained by conversion via the optical receiving section, to the first to n'th terminals to which the first to n'th modulated signals should be transmitted via the prescribed communication lines,

wherein each of first to n'th terminal devices includes a demodulating section for demodulating a modulated signal transmitted via a corresponding one of the prescribed communication lines,

wherein the parameter control section is operable to set the individual modulation

parameters so as to have values within a range such that the first to n'th modulated signals satisfy a condition concerning a transmission quality in the optical transmission path, and

wherein the parameter control section further includes:

a condition determination section for determining, based on the individual modulation parameters, whether the first to n'th modulated signals satisfy the condition concerning the transmission quality in the optical transmission path; and

a modifying section for modifying the individual modulation parameters when the condition determination section determines that the condition is not satisfied.

29. (New) The optical transmitting system according to claim 28, wherein the condition is such that a total mean square root optical modulation index, which is determined based on the individual modulation parameters of the first to n'th modulated signals, is lower than or equal to a prescribed value.

30. (New) The optical transmission system according to claim 28, further comprising a first transmission path connected between the receiving device and the transmitting device,

wherein the receiving device further includes:

a distortion monitoring section for detecting a distortion level at a prescribed frequency in an electric signal obtained by optical-to-electrical conversion via the optical receiving section; and

a distortion information transmitting section for transmitting distortion level

information about a distortion level detected by the distortion monitoring section to the transmitting device via the first transmission path, and

wherein the parameter control section is operable to set the individual modulation parameters such that the distortion level indicated by the distortion level information transmitted via the first transmission path becomes lower than or equal to a prescribed distortion level value.

**31. (New)** The optical transmission system according to claim 28, further comprising second transmission paths connected between each of the first to n'th terminal devices and the transmitting device,

wherein each of the first to n'th terminal devices further includes:

a quality detecting section for detecting signal quality of the modulated signals transmitted via the prescribed communication lines; and

a quality information transmitting device for transmitting the signal quality information about the signal quality detected by the quality detecting section via the prescribed communication lines, and

wherein the parameter control section is operable to set the individual modulation parameters such that the signal quality indicated by the signal quality information transmitted via the second transmission path satisfies a prescribed requirement.

**32. (New)** An optical transmission system comprising:

a transmitting device for transmitting a signal via an optical transmission path;

a receiving device for receiving the signal transmitted via the optical transmission path;  
and

first to n'th (where n is an integer of 2 or more) terminal devices connected via respective prescribed communication lines to the receiving device,

wherein the transmitting device comprises:

a modulating section for generating first to n'th modulated signals based on first to n'th data signals to be transmitted to the first to n'th terminal devices, respectively, the first to n'th modulated signals being obtained by modulation with individual modulation parameters;

an optical transmitting section for converting the first to n'th modulated signals generated by the modulating section into an optical signal and for transmitting the optical signal to the receiving device via the optical transmission path;

a data amount estimating section for estimating an amount of data for each of the first to n'th data signals; and

a parameter control section for setting the individual modulation parameters used in the modulating section based on amounts of data for the first to n'th data signals estimated by the data amount estimating section,

wherein the receiving device includes:

an optical receiving section for receiving the optical signal transmitted via the optical transmission path and for converting the optical signal into an electric signal; and

an electric transmitting section for transmitting the first to n'th modulated signals contained in the electric signal, which is obtained by conversion via the optical receiving section,

to the first to n'th terminals to which the first to n'th modulated signals should be transmitted via the prescribed communication lines,

wherein each of first to n'th terminal devices includes a demodulating section for demodulating a modulated signal transmitted via a corresponding one of the prescribed communication lines, and

wherein the individual modulation parameters include the number of subcarriers used for performing discrete multi-tone modulation on each of the first to n'th data signals.

**33. (New)** The optical transmission system according to claim 32, further comprising a first transmission path connected between the receiving device and the transmitting device,

wherein the receiving device further includes:

a distortion monitoring section for detecting a distortion level at a prescribed frequency in an electric signal obtained by optical-to-electrical conversion via the optical receiving section; and

a distortion information transmitting section for transmitting distortion level information about a distortion level detected by the distortion monitoring section to the transmitting device via the first transmission path, and

wherein the parameter control section is operable to set the individual modulation parameters such that the distortion level indicated by the distortion level information transmitted via the first transmission path becomes lower than or equal to a prescribed distortion level value.



34. (New) The optical transmission system according to claim 32, further comprising second transmission paths connected between each of the first to n'th terminal devices and the transmitting device,

wherein each of the first to n'th terminal devices further includes:

a quality detecting section for detecting signal quality of the modulated signals transmitted via the prescribed communication lines; and

a quality information transmitting device for transmitting the signal quality information about the signal quality detected by the quality detecting section via the prescribed communication lines, and

wherein the parameter control section is operable to set the individual modulation parameters such that the signal quality indicated by the signal quality information transmitted via the second transmission path satisfies a prescribed requirement.